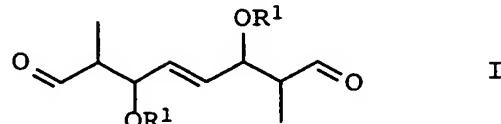


We claim:

1. A process for preparing carotenoids, which comprises reacting
 5 a dialkoxy dialdehyde of the general formula I



10

with R¹ = C₁-C₆-alkyl, in a double Wittig condensation with a phosphonium salt of the formula II or in a double Wittig-Horner condensation with a phosphonate of the formula III

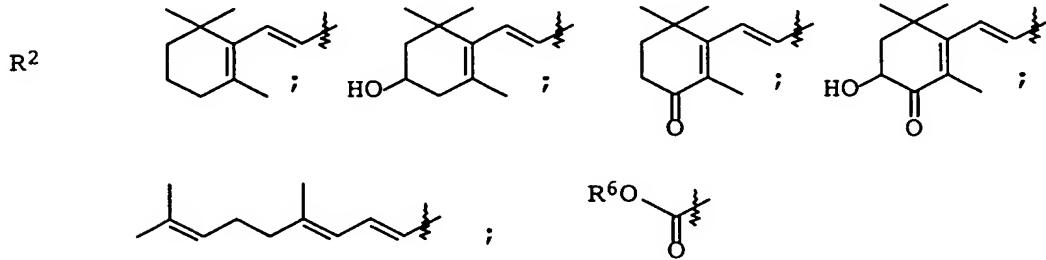
15



20

in which the substituents have independently of one another the following meaning:

25



35

R³ aryl;

40

R⁴ to R⁶

C₁-C₆-alkyl and

X⁻ an anion equivalent of an inorganic or organic acid.

45

2. The process according to claim 1, wherein X⁻ is the anion equivalent of an acid selected from the group consisting of hydrohalic acid, sulfuric acid, phosphoric acid, formic acid,

13

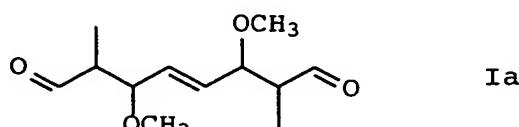
acetic acid and sulfonic acid.

3. The process according to claim 2, wherein X^- is Cl^- , Br^- , $C_nH_{2n+1}SO_3^-$ with $n = 1-4$, $Ph-SO_3^-$, $p-Tol-SO_3^-$ or $CF_3-SO_3^-$.

5

4. The process according to any of claims 1 to 3 for preparing a carotenoid selected from the group consisting of astaxanthin, lycopene and canthaxanthin, which comprises reacting a dialkoxy dialdehyde of the formula Ia

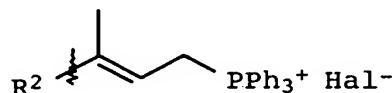
10



15

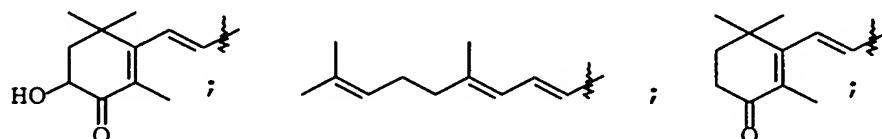
with a phosphonium salt of the formula IIa,

20



25

in which the substituents have independently of one another the following meaning:

30 R²

35

Ph phenyl;

Hal halide.

40

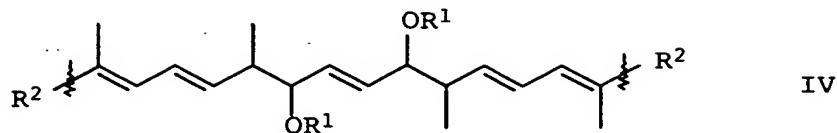
5. The process according to any of claims 1 to 4, wherein the reaction is carried out in a C₁-C₆ alcohol using an alkali metal or alkaline earth metal alkoxide as base.

45

6. The process according to any of claims 1 to 5, wherein the reaction product is thermally isomerized into the all(E) form and isolated by filtration.

7. Compounds of the formula IV,

14



5

in which the substituents R¹ and R² have independently of one another the meaning stated in claim 1.

10

15

20

25

30

35

40

45